Scott . . . where innovation is a tradition

SCOTT®

H. H. Scott, Inc. 111 Powdermill Road, Maynard, Mass., 01754

SERVICE MANUAL FOR MODEL 344-C

SPECIFICATIONS

TUNER (FM-MPX)

Usable Sensitivity (IHF)	1.9 microvolts
Cross Modulation Rejection	80 db
Signal to Noise Ratio	below 100% modulation 60 db
Total Harmonic Distortion	.6%
Frequency Deviation (Drift)	0.02%
*Frequency Response	20 to 15,000 Hz ± 2 db
Capture Ratio	2.5 db
Selectivity	40 db
Tuning Range	88 to 108 mc
Accuracy of Calibration	0.5%
Separation	40 db or more
FM & Limiting Stages	9

*This is limit of FCC Stereo Broadcast specifications. All H. H. SCOTT tuners have far wider frequency response.

TAPE OUTPUT

Rated Voltage Output to Tape Recorder	0.4 v
Minimum Recommended Load Resistance	Greater Than 47 k ohms

PRE-AMPLIFIER

Input:

Tape Head - Input Impedance	47 k ohms
Signal for Rated Output	3 mv
S/N Ratio	45 db
Phono-Input Impedance (All Switch Positions)	47 k ohms
High Level Inputs - Input Impedance	47 k ohms
Signal for Rated Output	400 mv
S/N Ratio	80 db
Frequency Response in Flat Position	25-45 khz ± 3 db
Treble Controls Measured at 10,000 Hz, Boost & Cut	10 db ± 2 db
Bass Controls Measured at 50 Hz, Boost & Cut	+10 db - 15 db
Loudness Compensation (maximum)	+11 db @ 50 Hz
Loudness Compensation	+2 db @ 10 k Hz

AMPLIFIERS

Power Ratio (watts per channel)	
@ 0.8% Harmonic Distortion	
@ 4 ohms	40 watts
@ 8 ohms	32 watts
Continuous Output Single Channel	
@ 8 ohms, 0.8% Harmonic Distortion	32 watts
Continuous Output Both Channels	
@ 8 ohms, 0.8% Harmonic Distortion	28 watts

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344-C AUDIO SECTION

Total Harmonic Distortion	0.5%
Frequency Response	18-25,000 ± 1 db
Power Bandwidth at Rated Distortion (IHF Method)	25-20,000 Hz
Hum and Noise (Phono)	78 db
Range of Line Voltage and Frequency	105-120V, 50-60 Hz
Power Consumption - 117 v at 60 Hz (AC only)	25-95 watts

EQUIPMENT REQUIRED

Audio Oscillator
VTVM
Oscilloscope
VOM
Load Box
Attenuator
Distortion Meter
Variac or equiv.
AC Supply Fixture

Set Controls to the Following:

Input Selector	EXTRA -1
Stereo Switch	MONO
Tone Controls	Flat "0"
Loudness	Min.
Stereo Bal. Sw.	Norm.
Noise Filter	OUT
Speaker Switch	Main-ON; Remote-OFF
Power Switch	OFF
Loud/Vol	VOL

1. Resistance checks
With negative lead of VOM to chassis, measure collector resistance Q2 & Q102 approx. 7k ohm, Q1 & Q101 approx. 10k ohm.

2. Bias, Balance Settings and Voltage Checks
Turn unit on. Watch carefully for any signs of voltage shorts. With bias pots (1k ohm) still full cw (from top of unit), check supply for 60-63V. Using VOM switched to 12 mA scale, adjust bias pots for 0.8 mA current from each test point in the rear of the unit to ground. Check bal. test point for half supply ±10%.

Check power supply board	for 33V ±10%
Check power supply board	for 12V ±1V

3. Sensitivity Check
Audio Oscillator @ .4kHz, input to EXTRA -1 .4V (±2 dB) input. Connect 8 ohm load to Main Speaker taps. Turn loudness pot to max. Observe output of 30 watts (15.5V). Check tape output jack with troubleshooting lead for same output as input signal. Repeat for EXTRA -2.

4. Distortion Check
At 15.5V output max. distortion 0.6% (one channel operating).

5. Tape Monitor Switch & Loudness Tracking Check
Audio Oscillator to EXTRA -1 at 20 dB below rated input (0.4V). Note output at Left channel speaker terminal. Put tape monitor switch in the IN position. Note loss of output. Connect input cable from L channel EXTRA input to L channel Tape In. Note restoration of signal out. Repeat process for R channel, then return tape monitor to OUT position. Check loudness control tracking, L and R channels, in 20 dB steps to -40 dB max. deviation ±3 dB.

6. Speakers Switch Check and Phone Jack Check
Speakers switch to OFF position. Note complete loss of signal, main & remote. Loudness to min., insert phone plug to phone jacks, remove speaker leads and connect to phone plug leads. Loudness to max., note drop of 26 ±2 dB. Switch main speakers on, note restoration of signal. Switch Remote speakers on, note drop in output of 1-2 dB. Connect load to Remote speaker terminals and repeat speaker check.

7. Crosstalk and Stereo Switch Check
At 1 kHz, turn loudness pot to max., Mono-Stereo switch to Stereo. Adjust input voltages for 8V L. output. Balance switch to bal. L, note drop of 0 dB. Bal. switch to Bal. R., note output drop 50 dB. Connect speaker leads to R output, Bal. switch to Bal. R and note 50 dB drop in output. Return Bal. switch to Norm. Adjust level for "0" dB (1V range).

8. Tone Control Check

Bass 100 Hz	Treble 10 kHz
Boost 10 dB ±2 dB	Boost 10 dB ±2 dB
Cut 10 dB ±2 dB	Cut 10 dB ±2 dB

9. Frequency Response Check

3 dB down @ 20 Hz or lower
3 dB down @ 40 kHz

10. Regulation Check
At 1 kHz, 8 ohm load out - output rise 1 dB max.

11. Noise Filter Check @ 5 kHz
Noise filter to IN, note 5 ±1 dB drop, noise filter out.

11a. Volume-Comp Switch (Control @ #4 flat)

Switch At:	Volume	Loudness
	100 Hz - 0 dB	8 dB ±2
	10 khz- 0 dB	2 dB ±2

11b. Check loudness control attenuation 70 dB from rated output.

12. Preamp Gain Check
Attenuate input 37 dB from Ref. (±2 dB) at 1 kHz, preamp sens. switch to LOW, input leads to phono, note output of 0 dB. Attenuate 5 dB more, preamp sens, switch to HIGH, note output of 0 dB.

13. Preamp Frequency Response Check.

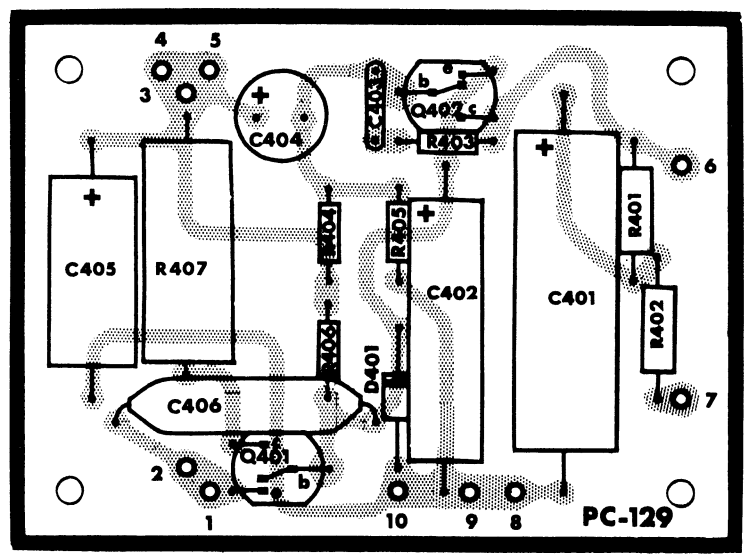
	Phono	Microphone
1 kHz	0 dB (REF.)	-3 ±2 dB
10 kHz	-12 ±2 dB	-3 ±2 dB
100 kHz	+13 ±2 dB	-3 ±2 dB

14. Hum Checks

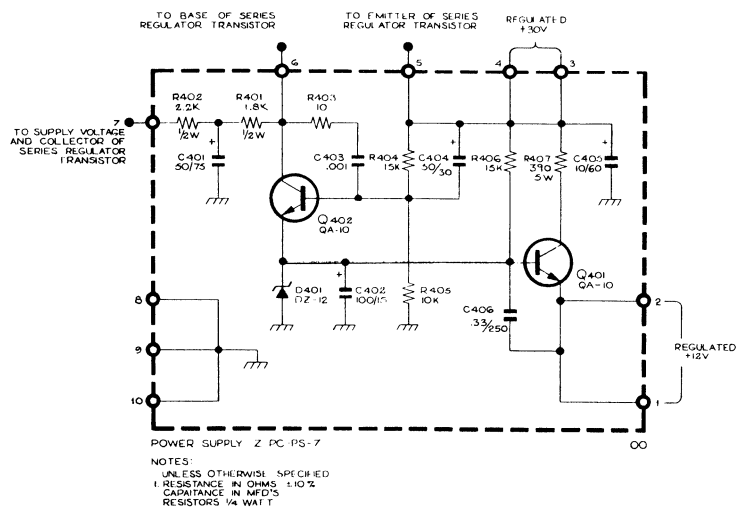
Position	Loudness Pot	Max. Hum
EXTRA	0	2 mv
EXTRA	10	5 mv
Preamp Sens. HIGH	10	15 mv
LOW	10	15 mv
Microphone	10	15 mv

15. Repeat Steps 8 through 14 for R channel.

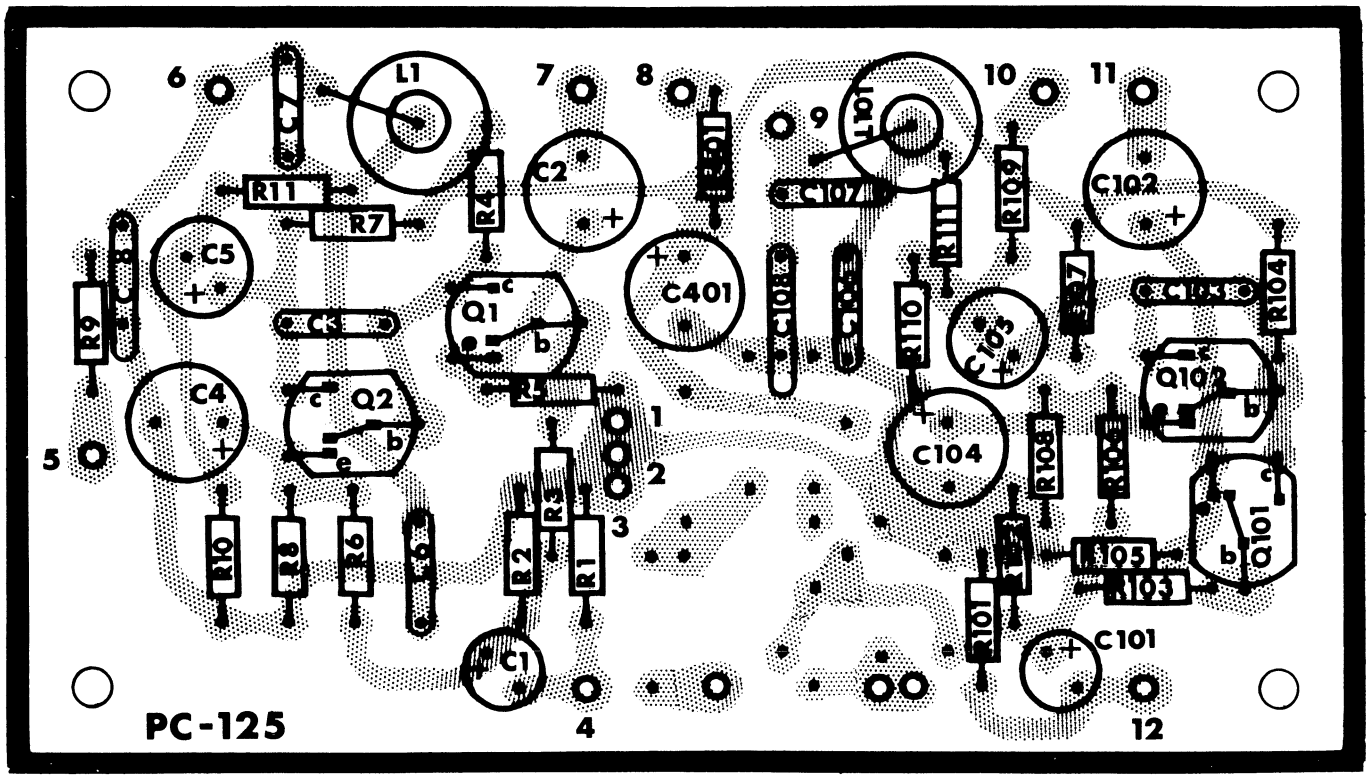
Q401, Q402 — QA-10



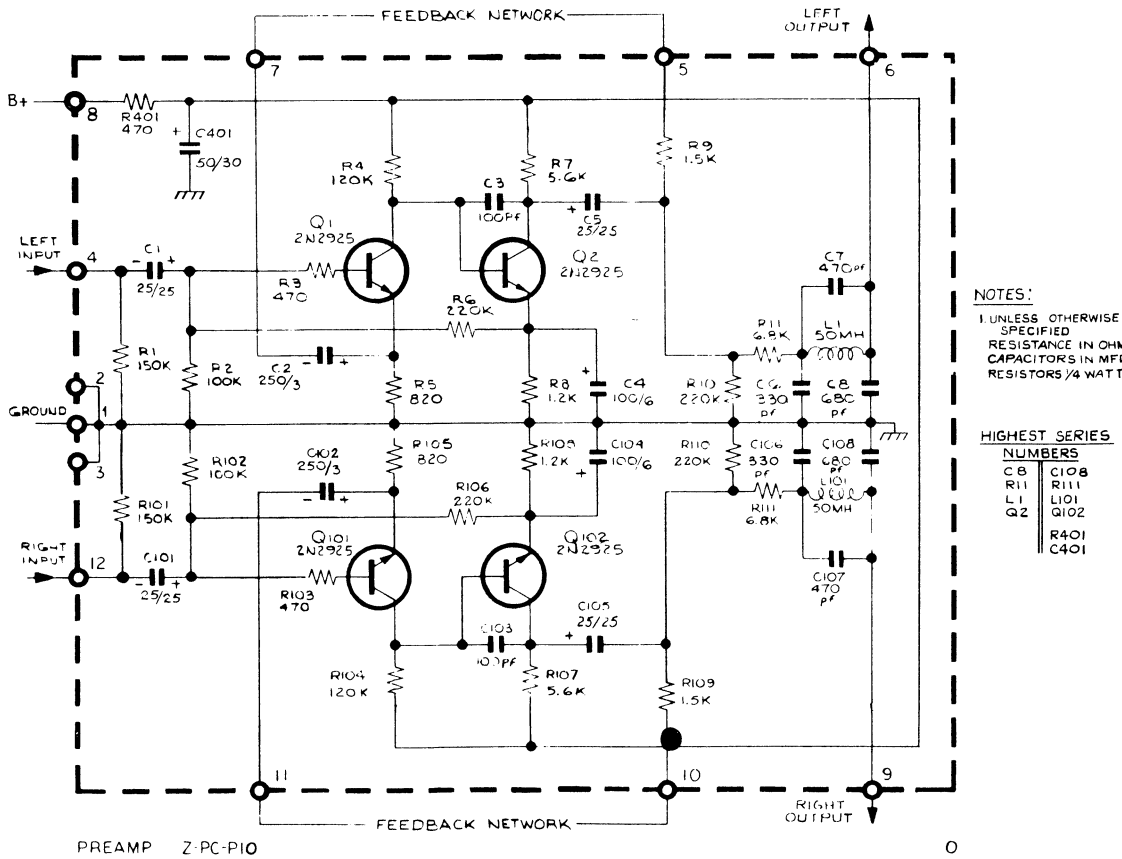
POWER SUPPLY Z-PC-PS-7 **00**



Q1 Q101,Q2,Q102 — 2N2925
Q301 — 2N2924



PREAMP Z-PC-P-10 **00**



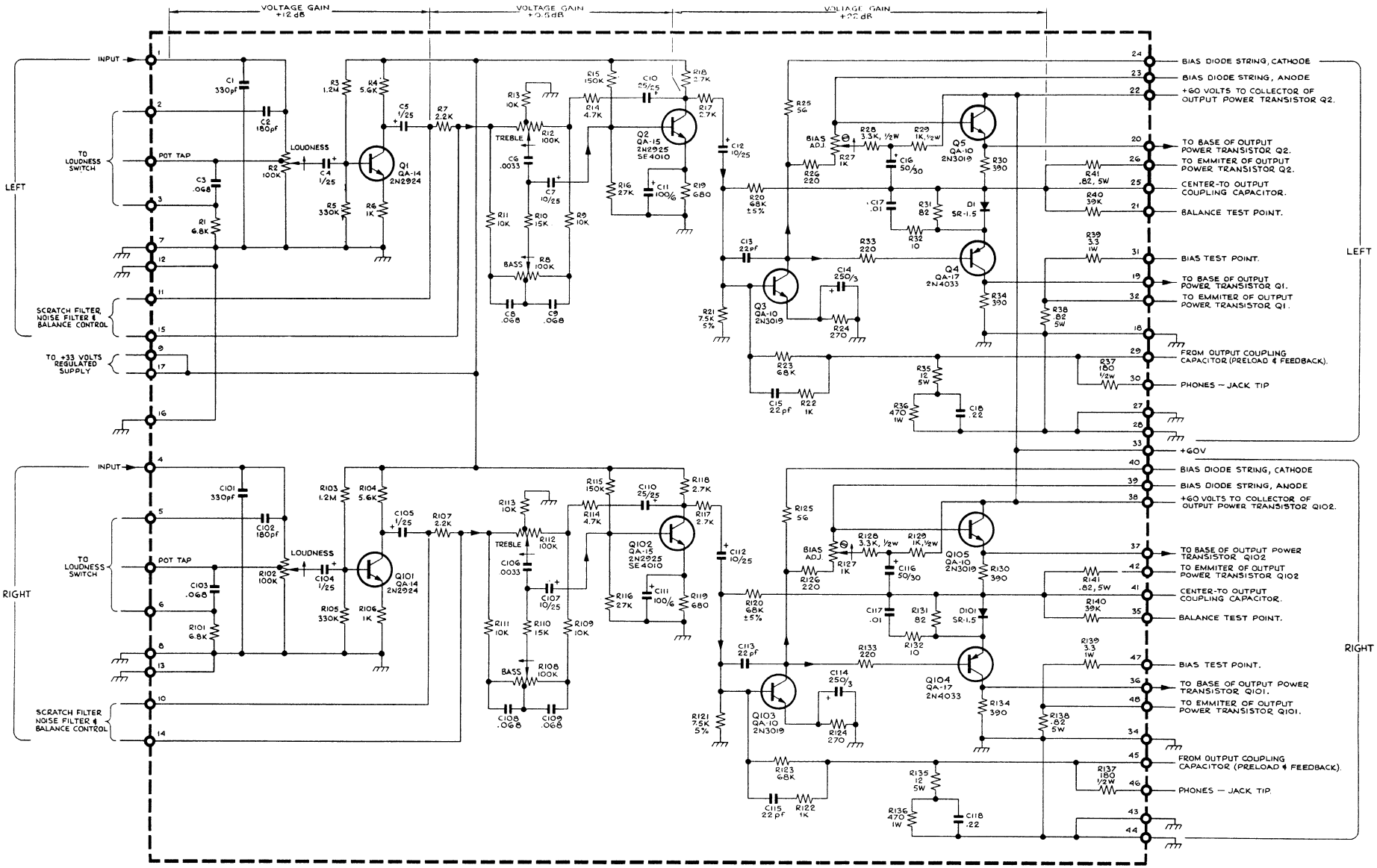
NOTES:
1. UNLESS OTHERWISE SPECIFIED RESISTANCE IN OHMS. CAPACITORS IN MFD'S. RESISTORS ¼ WATT.

HIGHEST SERIES NUMBERS

C8	C108
R11	R111
L1	L101
Q2	Q102
	R401
	C401

PREAMP Z-PC-P10 0

TONE CONTROL-DRIVER


VOLTAGE GAIN +12 dB
VOLTAGE GAIN +0.5dB
VOLTAGE GAIN +22 dB
LEFT
RIGHT
INPUT
TO LOUDNESS SWITCH
POT TAP
LOUDNESS
TREBLE
BASS
SCRATCH FILTER, NOISE FILTER & BALANCE CONTROL
TO +33 VOLTS REGULATED SUPPLY
BIAS ADJ.
BIAS DIODE STRING, CATHODE
BIAS DIODE STRING, ANODE
+60 VOLTS TO COLLECTOR OF OUTPUT POWER TRANSISTOR Q2.
TO BASE OF OUTPUT POWER TRANSISTOR Q2.
TO EMMITER OF OUTPUT POWER TRANSISTOR Q2.
CENTER-TO OUTPUT COUPLING CAPACITOR.
BALANCE TEST POINT.
BIAS TEST POINT.
TO BASE OF OUTPUT POWER TRANSISTOR Q1.
TO EMMITER OF OUTPUT POWER TRANSISTOR Q1.
FROM OUTPUT COUPLING CAPACITOR (PRELOAD & FEEDBACK).
PHONES — JACK TIP
+60V
TO BASE OF OUTPUT POWER TRANSISTOR Q102
TO EMMITER OF OUTPUT POWER TRANSISTOR Q102
TO BASE OF OUTPUT POWER TRANSISTOR Q101.
TO EMMITER OF OUTPUT POWER TRANSISTOR Q101.

NOTES:

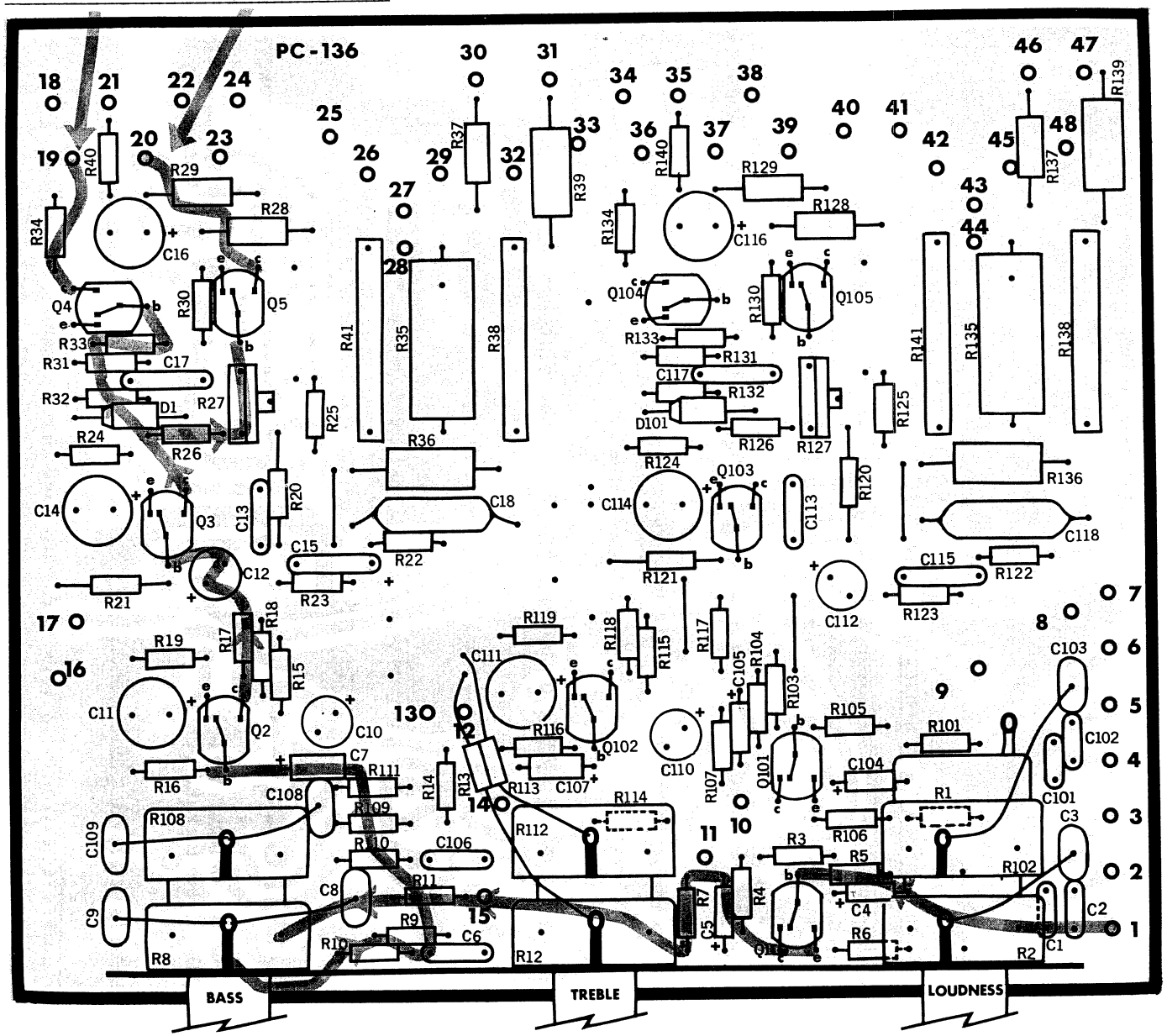
1. UNLESS OTHERWISE SPECIFIED: RESISTANCE IN OHMS ± 10%, CAPACITANCE IN MFD's., RESISTORS 1/4 WATT, ALL VOLTAGES D.C. ±15.
2. ARROWS ON POTENTIOMETERS INDICATE CW ROTATION.
3. ARROW HEADS INDICATE MAIN SIGNAL PATHS.
4. SMALL NUMBERED CIRCLES INDICATE THE 48 TERMINALS AND THE TWO TIE POINTS ON THE POT TAP OF LOUDNESS CONTROL.
5. VOLTAGE GAINS ±2dB AT 1KHz WITH ACVTVM, AND LOUDNESS FULL CW & TONE CONTROLS IN FLAT POSITION.

TONE CONTROL-DRIVER Z-PC-TD-8 00

HIGHEST SERIES NUMBERS

R41	R141
C18	C118
D1	D101

DRIVER OUTPUT TO TRANSISTORS (QP-8)



TONE CONTROL & DRIVER **Z-PC-TD-8**

Q1, Q101 - 2N2924 (QA-14)
Q2, Q102 - 2N2925, SE4010
Q3, Q103 } 2N3019 (QA-10)
Q5, Q105 }
Q4, Q104 - 2N4033 (QA-17)

LINE SHOWS SIGNAL PATH THRU AUDIO SECTION OF UNIT (LEFT CHANNEL)

344-C FM TUNER SECTION

EQUIPMENT REQUIRED

H.P. VTVM
Oscilloscope
VOM
Distortion Meter
FM Generator (or source)
MX Generator (or source)
Audio Generator (or source)

Set Controls to the Following:

Separation Pots	Max CW
Input Select. Switch	FM
Muting	OFF
Mode	STEREO

PRELIMINARY CHECKS

1. Mono Alignment and Sensitivity Check
Front End and IF Alignment
With about 10 uV generator output, align and peak front end for max. output.
With 3 uV input, align IF's for max. audio.
With 1 or 2K uV input, align detector for minimum distortion.

2. Sensitivity and Distortion
Measure sensitivity of tuner with 3 uV rf input. Must obtain 30 dB usable sensitivity at 92, 98, and 106 MHz.

Recheck distortion, 2k uV input. 400 Hz - max. distortion of 0.6%. Audio output 1.5V ±2 dB

3. FM Hum Check
Tune to 91.5 MHz, measure min. of 60 dB (may reverse ac plug)

4. De-emphasis Check
Tune to 90 MHz (change mod. to 8 kHz), note decrease of 12±2 dB in output.

5. Calibration Check
Check calibration against stations - max. tolerance 0±0.2 MHz.

TUNER SECTION

6. Muting Adjust
Tune to a point on the dial where no station is heard. Turn muting switch to ON. Adjust muting threshold pot to max CCW position. At this point noise will be observed at tape output jacks. Advance control clockwise until noise disappears and then slightly further, check unit for switching @ between 10 & 30 uV from generator.

7. Multiplex Alignment - Unit to Stereo

a) Pilot Adj.
Scope probe (low - Cap) to test point at base of Q3, peak L2 and L3 for max pilot.

b) With VOM across 2.2K resistor (R13) carefully tune L2 and L3 for max., then tune T1 for a dip. Measure 2.5-3.5V dc across emitter resistor R13.

c) Separation Adj. (Using Stereo Signal)
Output from L. tape out. Adjust scope to obtain pattern and adjust L2 for min output observing scope. Adjust L separation pot for min output. Tuner output from R. tape output and adjust R separation pot for min as outlined above. Repeat between L & R until no further improvement is seen.

d) Final separation measurements to be done in each channel:

Audio Modulation	Minimum Separation
400 Hz	35 dB

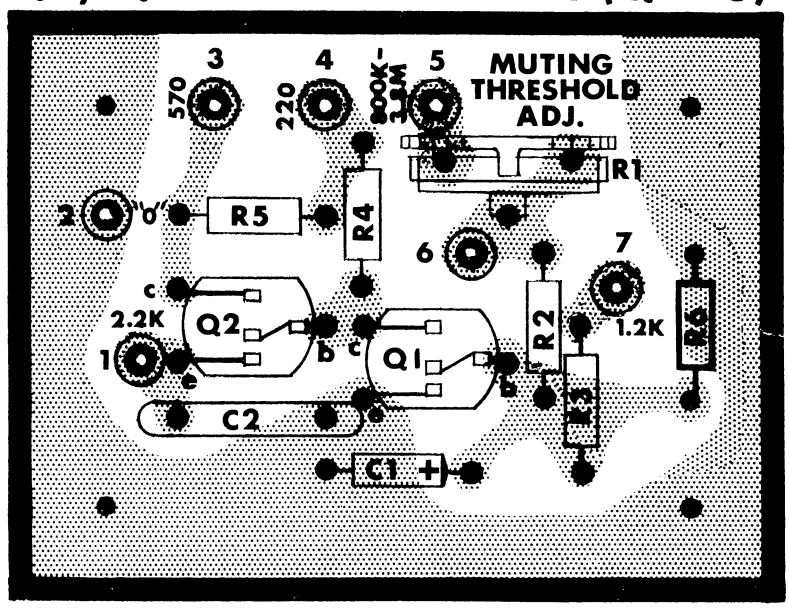
If separation spec are not met, recheck IF's for proper alignment, noise filter switch out. Also recheck steps 7.b) and 7.c).

e) Stereo Switchover Check
Check switchover point (at generators), min 10 uV, max 30 uV. Switchover may be adjusted by threshold pot on MX board.

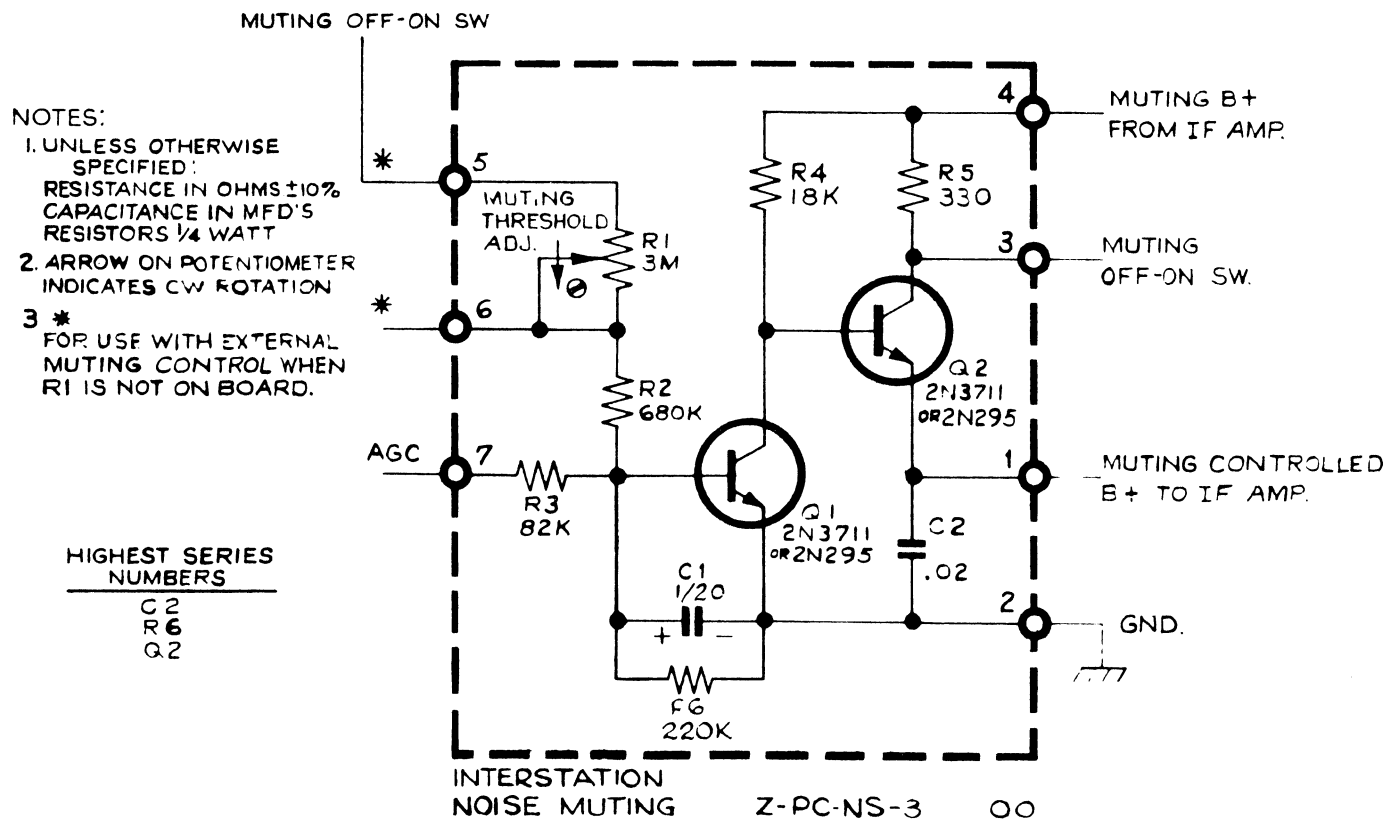
f) Final Listen Check
Check all inputs and outputs (including phone jacks), switches and controls for proper operation. Check over-all appearance and scrap inside unit. Check for proper switching of stereo light. Check calibration against stations - specs are $\pm$0.2 MHz.

MUTING CIRCUIT

Q1 , Q2 - 2N2925 or 2N3711 (QA-15)



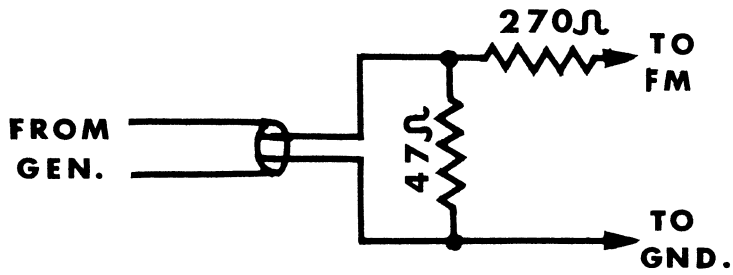
INTERSTATION NOISE MUTING Z-PC-NS-3 00



FM FRONT END ALIGNMENT FOR

344-C FM SECTION

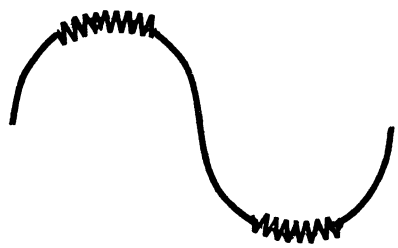
1. **Connect RF generator to the antenna terminals with the following adaptations:**



2. **Set RF generator and FM tuning dial to 92 mHz. Generator output should be about 6 uv. Peak L205, L204 and L201 for maximum audio output.**

3. **Set generator and FM tuning dial to 106 mHz. Peak RF trimmer and mixer trimmer.**

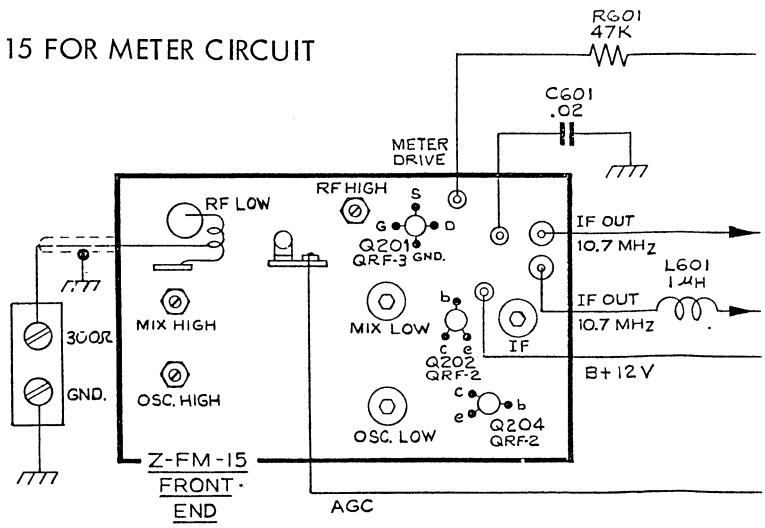
4. **With about 3 uv from FM generator, repeat procedure until no further output is obtained. Signal should look like this:**



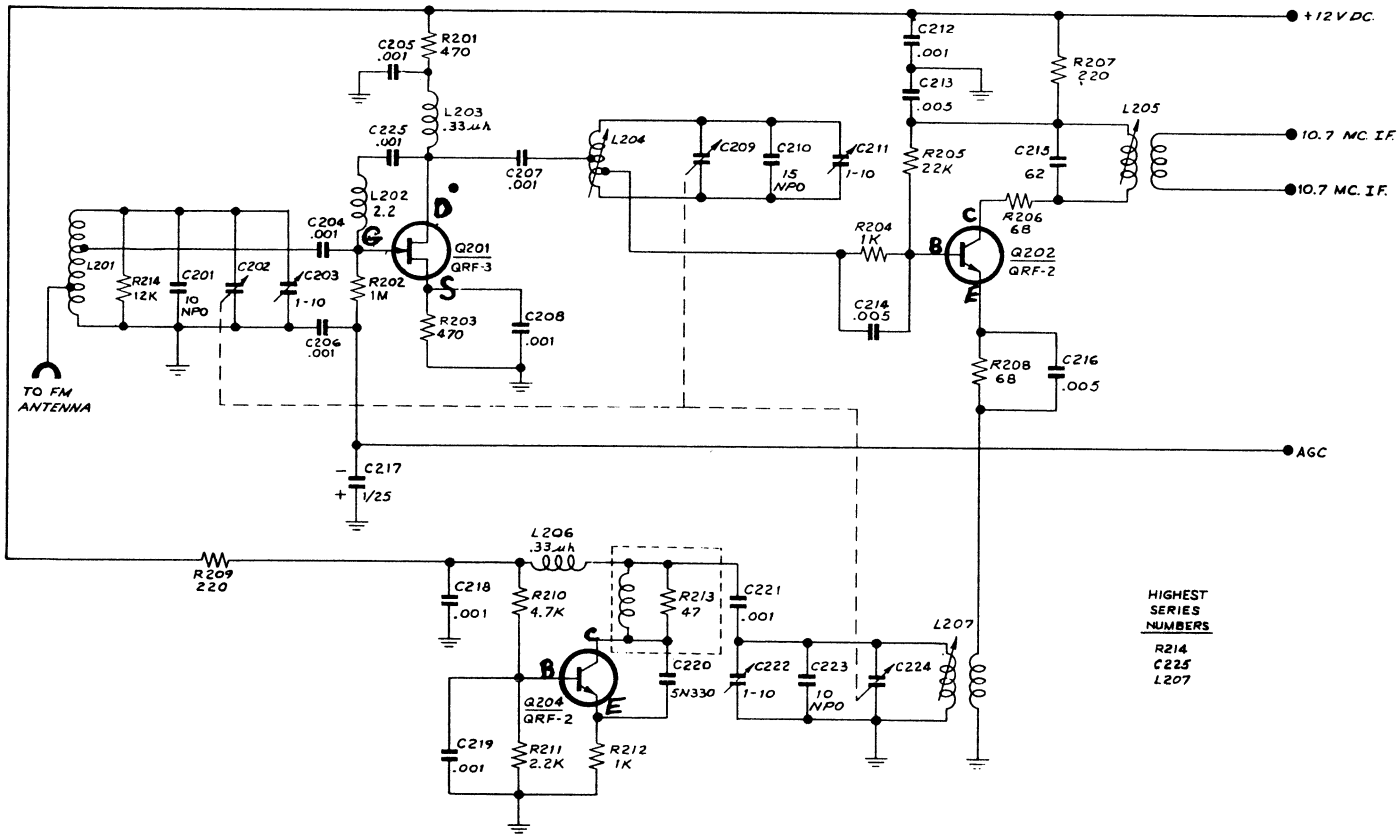
5. **The only time that the oscillator mixer and trimmer should be touched is if the calibration is out of specification.**

SEE PAGE 15 FOR METER CIRCUIT

Mechanical layout of Front End denoting, Oscillator, Mixer, Antenna Coils and Voltages present under normal operating conditions



344-C FRONT END



All voltages measured with 20,000 ohm/volt VOM; 300 ohm antenna and no signal.

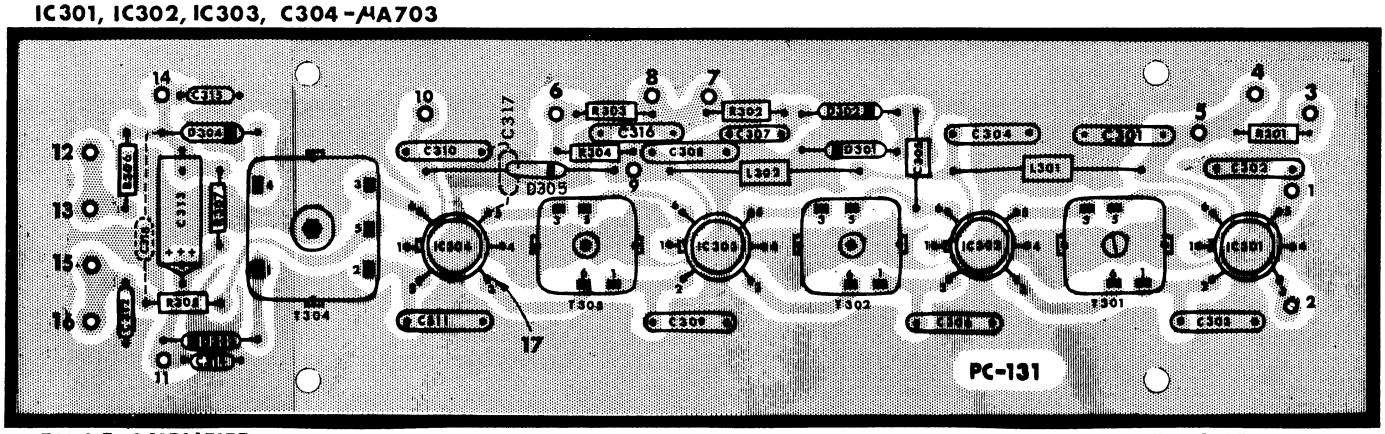
Q201		Q202		Q204	
G	.025	B	.45	B	3
D	9.2	E	.05	E	2.6
S	1.05	C	10.8	C	10.2

Troubleshooting Guide

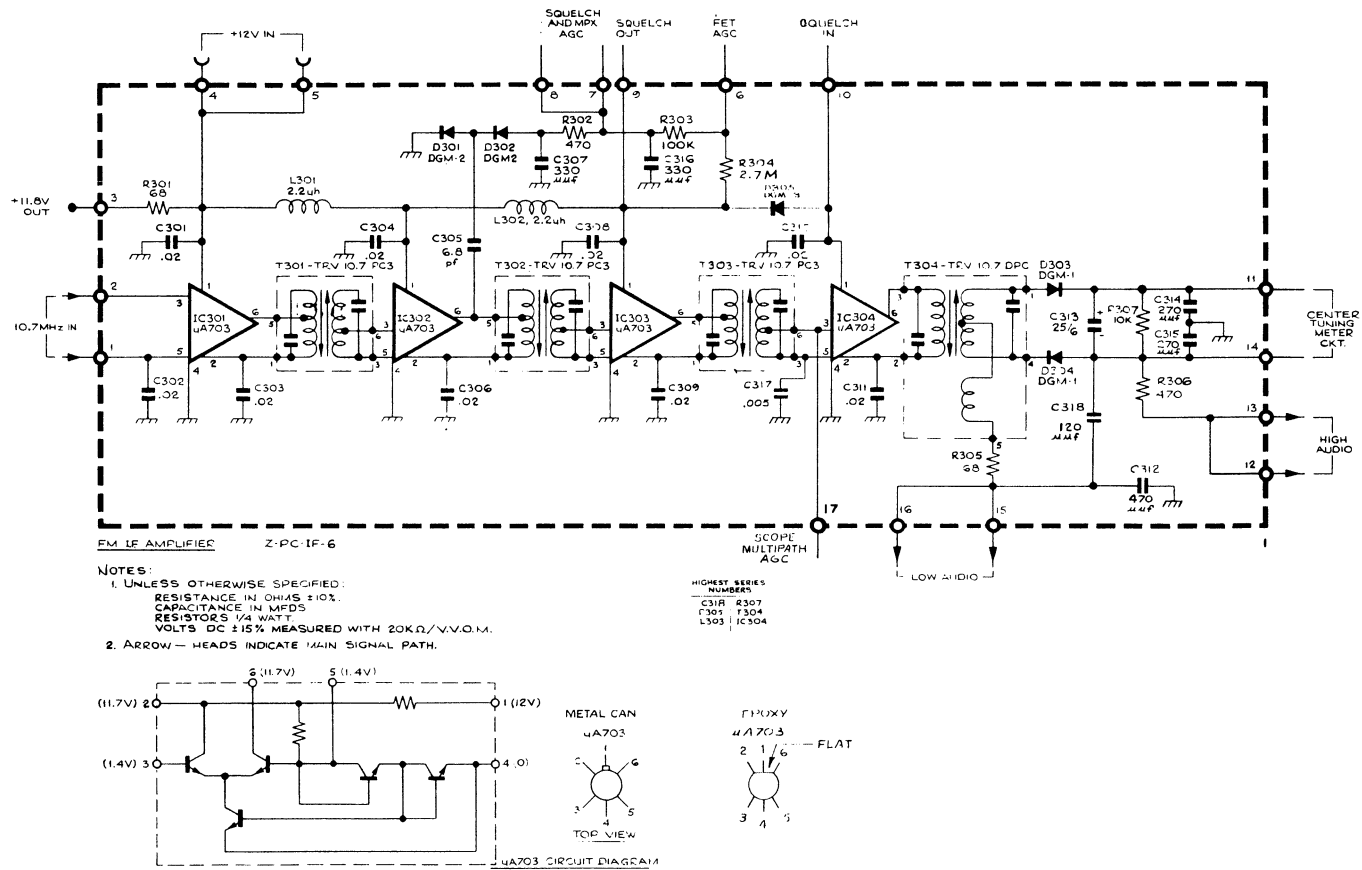
Trouble	Possible Remedy
Low gain	Replace Q201
No Output	Open LRFC 2.2 or .33 defective Q201, Q202, Q204

TROUBLESHOOTING PROCEDURE FOR IC-IF-4

IC301, IC302, IC303, C304 - μA703



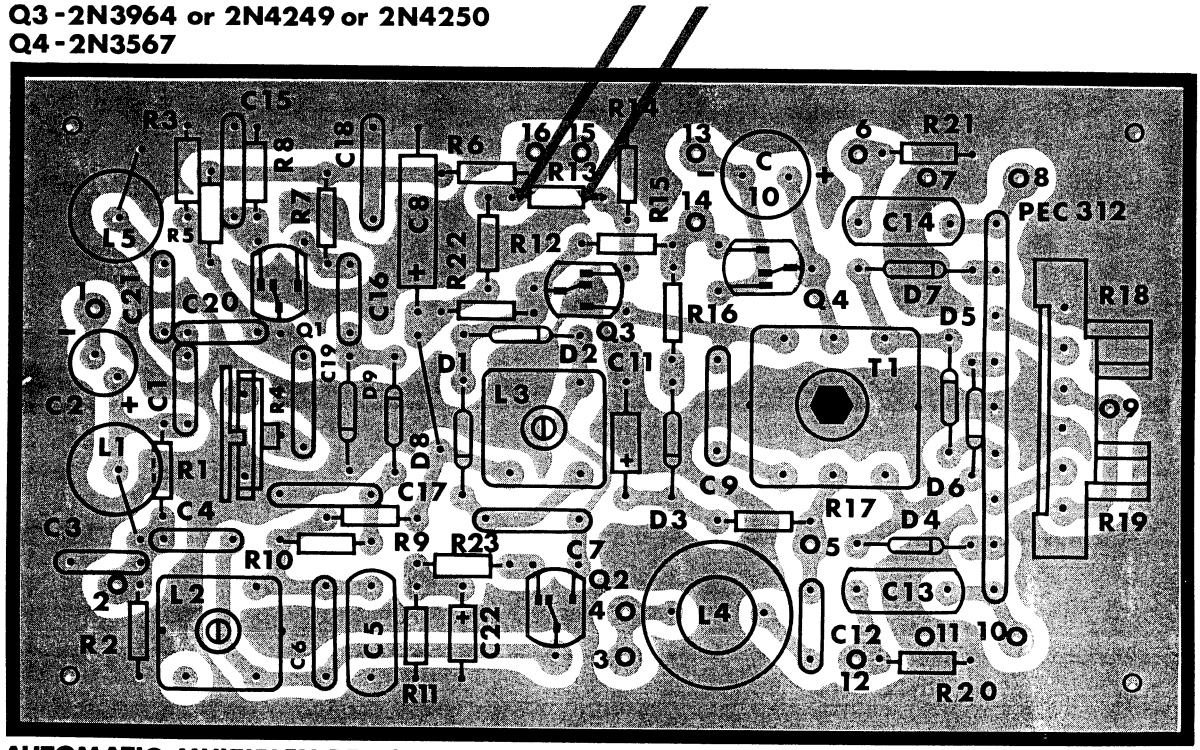
FM I.F. AMPLIFIER **Z-PC-IF-6** 1



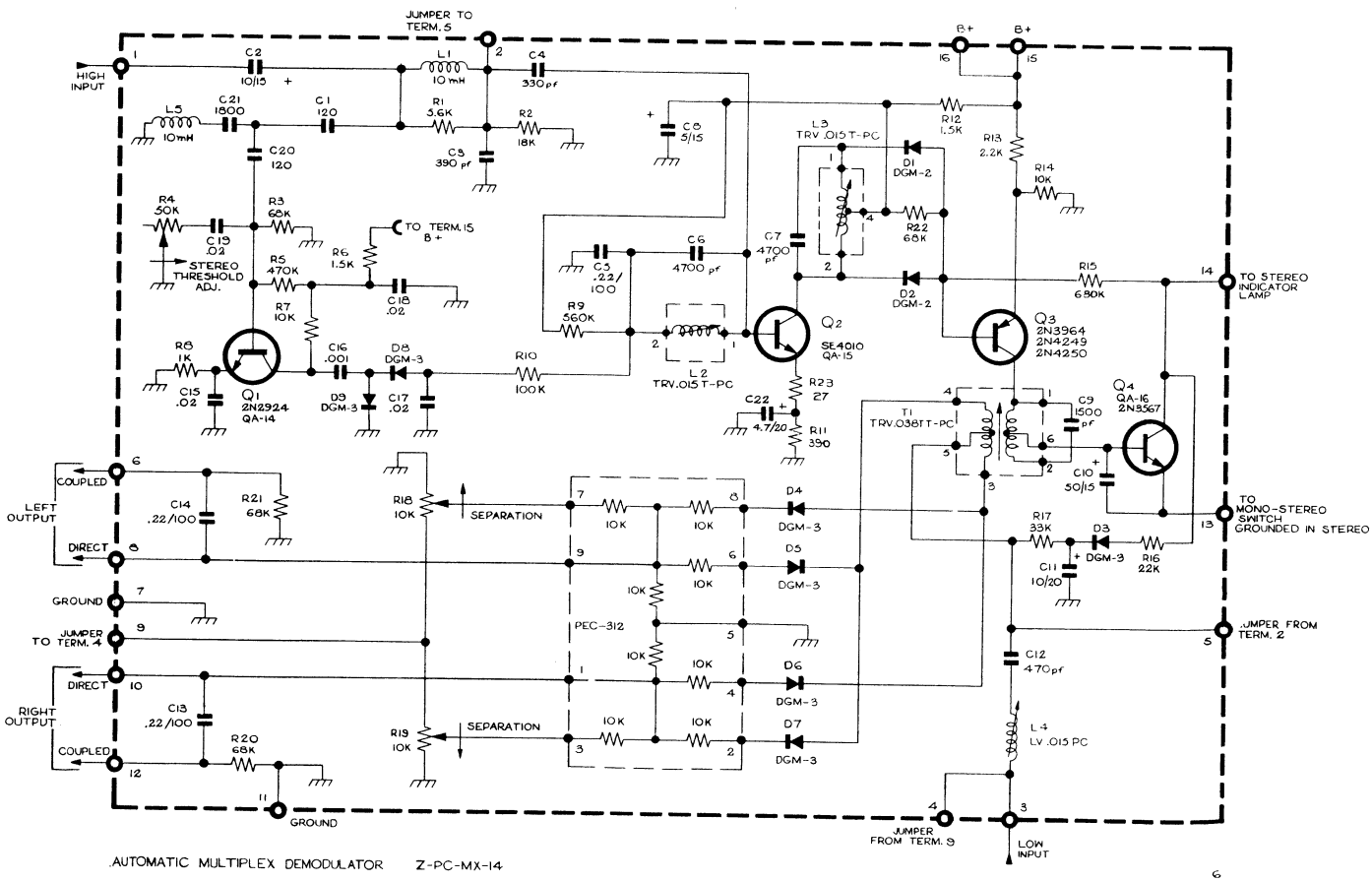
VOLTAGE CHECKS (UA703)

Pin 1	B+ 12 Volts
Set VOM on 3 volt scale:	positive lead of meter on pin 1, negative lead on pin 2 and/or pin 6. If voltage is apparent, then that particular stage of IC is operating normally
No output or distortion Meter operates okay	check diodes D303 and D304 for defect
Meter pegging either direction	defective D301 or D302

Q1 - 2N2924
Q2 - 2N2925 or SE4010 or QA-15
Q3 - 2N3964 or 2N4249 or 2N4250
Q4 - 2N3567

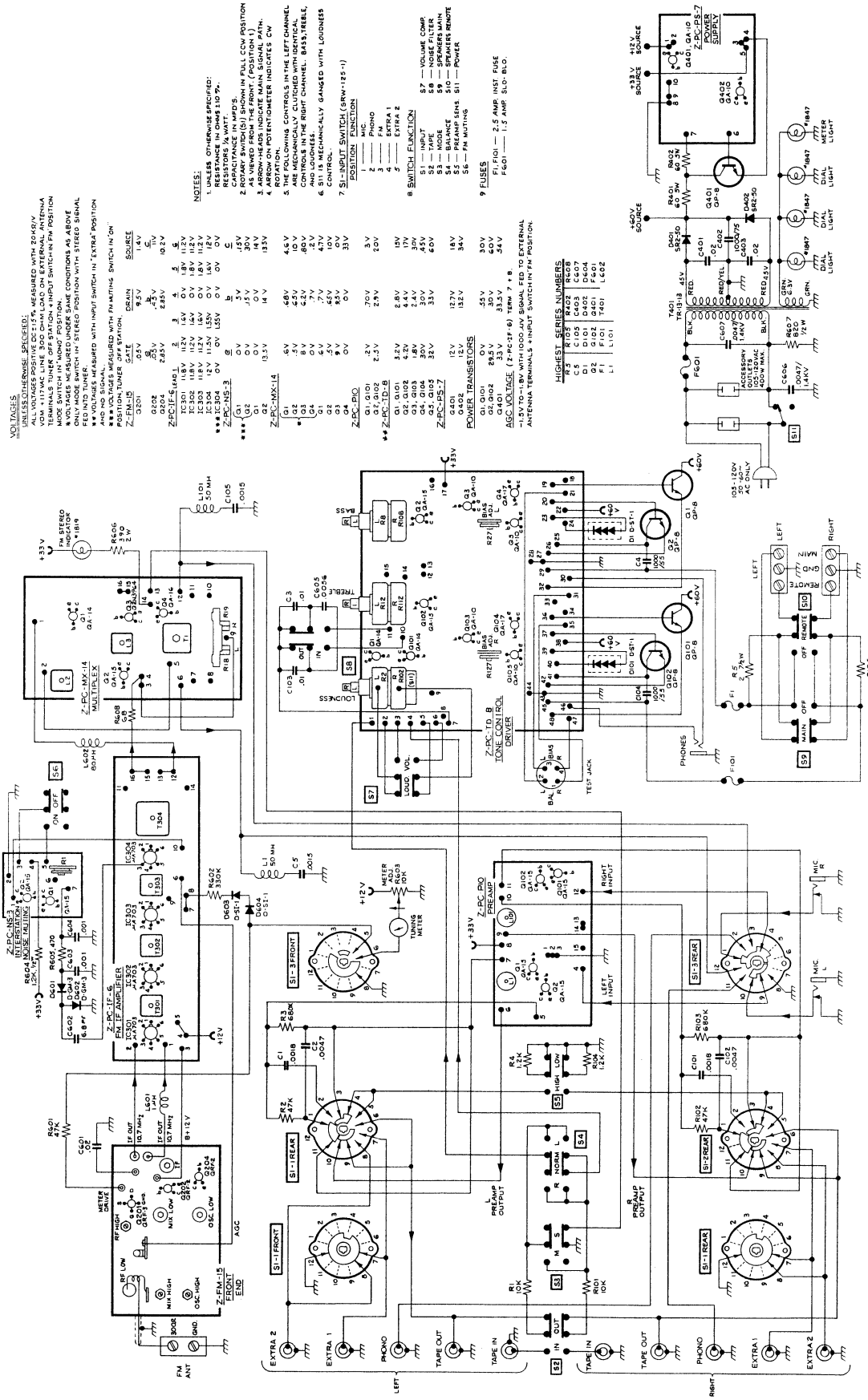


AUTOMATIC MULTIPLEX DEMODULATOR Z-PC-MX-14 **01**



AUTOMATIC MULTIPLEX DEMODULATOR Z-PC-MX-14

NOTES:
1. UNLESS OTHERWISE SPECIFIED: RESISTANCE IN OHMS ±10%
   CAPACITANCE IN MFD'S RESISTORS 1/4 WATT.
2. ARROWS ON POTENTIOMETERS INDICATE CW ROTATION.


VOLTAGES
UNLESS OTHERWISE SPECIFIED:
ALL VOLTAGES ARE D.C., MEASURED WITH 20K/V VOM, 117 VAC LINE, 300 OHM LOAD ON EXTERNAL ANTENNA TERMINALS, TUNER OFF STATION, + INPUT SWITCH IN FM POSITION, MODE SWITCH IN "MONO" POSITION.
** VOLTAGES MEASURED UNDER SAME CONDITIONS AS ABOVE ONLY MODE SWITCHED TO STEREO POSITION WITH STEREO SIGNAL FED INTO TUNER.
*** VOLTAGES MEASURED WITH INPUT SWITCH IN "EXTRA" POSITION AND NO SIGNAL.
**** VOLTAGES MEASURED WITH FM MUTING SWITCH IN "ON" POSITION, TUNER OFF STATION.
Z-FM-15
GATE
DRAIN
SOURCE
Q201 .05 V 9.5 V 1.4 V
Q202 .85 V 8.5 V 1 V
Q204 2.85 V 2.85 V 10.2 V
Z-PC-IF-6 LEAD 1 2 3 4 5
IC301 11.8 V 11.2 V 1.6 V 0 V 11.8 V 11.2 V
IC302 11.8 V 11.2 V 1.6 V 0 V 11.8 V 11.2 V
IC303 12 V 11.3 V 1.55 V 0 V 1.6 V 12 V
IC304 0 V 0 V 1.55 V 0 V 0 V 0 V
Z-PC-NS-3 a b c
Q1 0 V 5 V .15 V
Q2 0 V .5 V 10 V
Q3 13.5 V 14 V 13.5 V
Z-PC-MX-14
Q1 .6 V .68 V 4.6 V
Q2 .3 V .45 V 10 V
Q3 .3 V .45 V 10.2 V
Q4 0 V .7 V 2 V
Q1 6 V .7 V 4.7 V
Q2 .5 V .65 V 10 V
Q3 9 V 9.5 V 10 V
Q4 0 V 9 V 33 V
Z-PC-PIO
Q1, Q101 .2 V .70 V 3 V
Q2, Q102 2.3 V 2.9 V 20 V
Z-PC-TD-8
Q1, Q101 3.2 V 2.8 V 13 V
Q2, Q102 4.2 V 4.4 V 17 V
Q3, Q103 4.2 V 4.4 V 33 V
Q4, Q104 30 V 30 V 45 V
Q5, Q105 32 V 33 V 60 V
Z-PC-PS-7
Q401 12 V 12.7 V 18 V
Q402 13.2 V 13.2 V 34 V
POWER TRANSISTORS
Q1, Q101 0 V .55 V 30 V
Q2, Q102 29.5 V 30 V 60 V
Q401 33 V 33.3 V 54 V
AGC VOLTAGE (Z-PC-IF-6) TERM 7 + 8
-1.5 V TO -11.8 V WITH 1000 μV SIGNAL FED TO EXTERNAL ANTENNA TERMINALS + INPUT SWITCH IN FM POSITION.
NOTES:
1. UNLESS OTHERWISE SPECIFIED:
RESISTANCE IN OHMS ±10%.
CAPACITANCE IN MFD'S.
RESISTORS ¼ WATT.
2. ROTARY SWITCH (S1) SHOWN IN FULL CCW POSITION AS VIEWED FROM THE FRONT. (POSITION 1)
3. ARROW-HEADS INDICATE MAIN SIGNAL PATH.
4. ALL POTENTIOMETER INDICATES CW ROTATION.
5. THE FOLLOWING CONTROLS IN THE LEFT CHANNEL ARE MECHANICALLY CLUTCHED WITH IDENTICAL CONTROLS IN THE RIGHT CHANNEL: BASS, TREBLE, AND LOUDNESS.
6. S11 IS MECHANICALLY GANGED WITH LOUDNESS CONTROL.
7. S1—INPUT SWITCH (SRW-125-1)
POSITION FUNCTION
1 — MIC
2 — PHONO
3 — FM
4 — EXTRA 1
5 — EXTRA 2
8. SWITCH FUNCTION
S1 — INPUT
S2 — TAPE
S3 — MODE
S4 — BALANCE
S5 — PREAMP SENS
S6 — FM MUTING
S7 — VOLUME COMP.
S8 — NOISE FILTER
S9 — SPEAKERS MAIN
S10 — SPEAKERS REMOTE
S11 — POWER
9 FUSES
F1, F101 — 2.5 AMP INST FUSE
F601 — 1.5 AMP SLO BLO.
HIGHEST SERIES NUMBERS
R5 R105 R402 R608
C5 C105 C403 C607
Q1 Q101 Q402 Q604
Q2 Q102 Q401 Q601
F1 F101 T401 L602
L1 L101
Z-PC-NS-3 INTERSTATION NOISE MUTING
Z-PC-MX-14 MULTIPLEX
Z-PC-IF-6 FM IF AMPLIFIER
Z-FM-15 FRONT END
Z-PC-PIO PREAMP
Z-PC-TD-8 TONE CONTROL DRIVER
Z-PC-PS-7 POWER SUPPLY
FM STEREO INDICATOR LAMP #1819
FM ANT
EXTRA 2
EXTRA 1
PHONO
TAPE OUT
TAPE IN
LEFT
RIGHT
MIC
PHONES
TEST JACK
TUNING METER
AGC
+33 V
+12 V
+60 V
105-120V 50-60 CY AC ONLY
ACCESSORY 1.4AV 105-120VAC 100 MA MAX
#1847 DIAL LIGHT
METER LIGHT

344-C PARTS PRICE LIST

Part #	Description	Customer List
A-DC-21	Dial Cord	$ 1.75
A-FW-B	Flywheel Assembly	4.80
CEC-1000/75	Electrolytic Capacitor	4.32
CETM-1000/55	Electrolytic Capacitor	3.43
D-S1-1	Diode	.40
D-GM-3	Diode	.32
F-AGX-2.5	Fuse	.24
F-SB-1½	Fuse	.72
J-3-ST-8	Phone Jack	1.05
J-3-ST-7	Phone Jack	.98
KN-007	Knob	1.05
KN-006F	Knob	1.05
KN-006R	Knob	1.05
KN-005	Knob	1.54
M-SS-11	Meter	5.95
N-344C-1	Front Panel	14.95
N-D-FM-25	Dial Glass	4.56
QP-8	Power Transistor	6.00
RCV-10K-PH	Potentiometer	1.00
RWS-15-2X2	Stand-up Resistor	1.47
RW5-60	Power Resistor	.32
SR-2-50	Rectifier	.80
SRW-125-1	Switch	6.12
SS-22	Switch	.40
SS-43-3	Switch	.72
S-PB-22X7	Push Button Switch	8.40
TR-13-3	Power Transformer	26.75
V-PL-1819	Bulb (Stereo)	.40
V-PL-1847	Bulb (Stereo)	.40
Z-ANT-FM-2	Dipole Antenna	1.75
Z-FM-15	Front End	26.84
Z-PC-MX-14	Multiplex Board	25.12
Z-PC-NS-3	Squelch-Noise	9.36
Z-PC-P10	Preamp Board	17.90
Z-PC-PS-7	Power Supply Board	12.70
Z-PC-IF-6	IF Strip	26.05
Z-PC-TD-8	Driver-Tone Board	40.00